

## 1.0 INTRODUCTION

This Closure Report for Remediation at the Defense Reutilization and Marketing Organization (DRMO) Open Trench and Burn and Debris Area located at Sierra Army Depot (SIAD) was prepared on behalf of the U.S. Army Corps of Engineers (USACE), by Innovative Technical Solutions, Inc. (ITSI), under the Small Action Remediation Type (SmART) Contract Number DACA05-98-D-0026, Task Order Number 0007. The scope of work (SOW) included a Workplan with sampling and analysis plan (SAP) and quality assurance project plan (QAPP) prepared by USACE (USACE, 1999) which identified completion activities for the site.

SIAD is an active military facility located approximately 4 miles west of the California-Nevada state border and 5 miles east of U.S. Highway 395 in Lassen County, California (Figure 1). The DRMO site, comprised of the Open Trench and the Burn and Debris areas, is located about 1/2 mile east of the Main Magazine Road in the southern portion of SIAD just west of the active DRMO storage yard (Figure 2). The Open Trench Area was a former disposal trench approximately 290 feet long, 40 feet wide, and 10 feet deep (Figure 3). The trench was reportedly used from 1942 to 1987 for disposal of waste oils, oil, sludge, solvents, and cleaning fluids from vehicle maintenance activities. The Burn and Debris area is approximately 175 feet long and 55 feet wide (Figure 2). The two areas contained a layer of debris from burning activities, some of which was removed under this action.

The Final Record of Decision/Remedial Action Plan (ROD/RAP) for the DRMO Burn and Debris area identified four compounds of concern and their remediation levels: polychlorinated biphenyls (PCB) Aroclor 1260 at 4.5 milligrams per kilogram (mg/Kg); antimony at 30 mg/Kg; lead at 1,000 mg/Kg; and copper at 2,500 mg/Kg. The objective of the remediation was the excavation and disposal of Burn and Debris area soils above the remediation levels, and backfill of both the Open Trench and Burn and Debris areas. Appendix A presents Sections 1 through 4 of the SOW for this project.

The Closure Report presents the results of the remediation of the DRMO site, which involved excavation of 175 cubic yards (CY) of in-placed soil, off-site disposal of 320 CY of non-hazardous soil and surface debris, and 140 CY of non-Resource Conservation Recovery Act (RCRA) California-Hazardous soil. The open trench area and excavated area were backfilled with 2,350 CY and 175 CY, respectively, of USACE pre-approved imported fill material.

## 2.0 FIELD ACTIVITIES

Prior to the start of fieldwork, a preparatory meeting with SIAD representatives from the Safety, Fire, and Environmental Departments, USACE, and ITSI was held on August 3, 1999. During this meeting, pre-excavation notifications and field schedules were submitted and a utility clearance was scheduled with the SIAD Communications Department. An Occupational Safety and Health Administration (OSHA) excavation notification was not required due to the shallow excavation depth of two feet planned. Appendix B includes the excavation permit issued by Sierra Army Depot.

Field activities began on August 9, 1999 and were completed on October 27, 1999. Activities included surface-only removal of debris and vegetation limited to a 10-foot perimeter around both the trench and burn areas, excavation in the burn and debris area, abandonment of five cased borings within the trench, and backfill of both areas.

The original task order included the characterization and disposal of five drums staged next to the trench. The drums were presumed to contain drill cuttings from installation of the cased borings. When granulated carbon was found in the drums, it was determined that SIAD environmental personnel would handle the characterization and disposal of the drums. The task order was modified to delete this task and add the disposal of several large piles of scrap metal debris located outside of the immediate work areas.

A chronology of field activities is presented in Table 1. The Sections 2.1 and 2.2 summarize the specific activities at the Open Trench area and the Burn and Debris area, respectively. Supporting data (e.g. field dailies, sampling documentation, analytical results, data validation, backfill specifications, survey data, and disposal documentation) are provided in Appendices C through K. Certificates of disposal will be provided under a separate cover when received from the disposal facilities.

### 2.1 DRMO OPEN TRENCH AREA ACTIVITIES

Hand removal of debris and vegetation within the trench and a 10-foot perimeter around the trench began on August 9, 1999. Past use of the trench had resulted in the accumulation of a variety of debris, including wood, plastic, and metal in various forms. Only debris laying on the surface or partially buried debris easily removed by hand was removed; no excavation for buried debris within the trench was done. This activity also included the removal of several piles of scrap metal

debris staged outside the immediate work area. Due to the weight and irregular size of the scrap metal, a backhoe was used to move the debris into roll-off containers.

Throughout the initial debris removal activities, a SIAD facility ordnance specialist was on-site to ensure that none of the debris included explosive ordnance or unexploded ordnance. The SIAD ordnance specialist inspected all unknown objects prior to ITSI personnel handling them. No objects of concern were encountered.

The debris removal activities generated three 40-CY and two 20-CY roll-off containers, which were transported to the Allied Waste facility operated by Forward, Inc., near Manteca, California for landfill disposal. Appendix C presents field notes and photographic documentation of the trench area before and after debris clearance.

### **2.1.1 Closure of Soil Borings**

Prior to backfill and compaction activities in the Open Trench, five cased soil borings were abandoned in accordance with California Well Standards. A total of 80 linear feet of cased soil borings were over-drilled and backfilled using a cement-bentonite grout. Approximately 0.75 CY of cuttings was generated. Appendix C presents field notes and photographic documentation of the abandonment.

Drill cuttings from the abandonment were composite sampled (SIAD-C-25) and profiled with soil and debris from the Burn and Debris area for disposal. Appendix H provides profiling and manifest documentation for disposal of the drill cuttings.

## **2.2 DRMO BURN AND DEBRIS AREA EXCAVATION ACTIVITIES**

Prior to excavation, the area was cleared of minor amounts of debris and vegetation, the excavation limits were surveyed by a State of California licensed civil engineer, and personnel for SIAD Communications cleared the area for underground utilities. Excavation and discrete sampling of the DRMO Burn and Debris area was conducted in compliance with the workplan provided in the SOW (USACE, 1999). Five 15-square-foot grids were excavated to a total depth of two feet below ground surface (bgs) and discrete samples were collected from the floor and sidewalls of each grid. Based on analytical results, three smaller step-out excavations were made from three of the grids before the remediation levels for antimony, lead, copper, and PCB 1260 were met. Figure 4 presents surveyed area of the five original grids (Excavations 1 through 5), the three step-out excavations, and the location of the confirmation samples collected. Figure 5 presents the

work exclusion zones used during the excavation activities. Tables 2 through 5 summaries the analytical results. Supporting documentation for the excavation and sampling (e.g. sample location logs, chains-of-custody, analytical data, and photographic documentation) are presented in Appendix D.

#### **2.2.1 Initial Soil Excavation and Confirmation Sampling**

Approximately 85 CY of soil was excavated from Excavation areas 1 through 5. The soil was placed into ten lined 20 CY roll-off containers and sampled for disposal characterization. Bins were unable to be placed adjacent to the excavation areas due to the unstable nature of the soils in the area. Rolls of polyethylene sheeting were laid down and secured using sandbags along the route between the excavation and the bins, and material was transported using a front-end loader over the plastic sheeting to the bins. At the completion of soil excavation activities, the sheeting was pulled up and placed into the containers for disposal with the soil. Section 2.7 summarizes the waste characterization results and identifies the disposal facility destination.

Discrete confirmation samples were collected from the sidewalls (at 1-foot bgs) and the center of the bottom of each excavation. Quality control (QC) duplicate samples were taken at a rate of 10 percent and sent to the contract laboratory (Nevada Environmental Laboratories [NEL] in Reno, Nevada) for analysis. Quality assurance (QA) duplicate samples were collected at a rate of 10 percent and sent to the USACE contract laboratory (Sequoia Laboratory in Petaluma, California) for analysis. Results of the QA samples are not discussed in this report.

#### **2.2.2 First Step-Out Excavation and Confirmation Sampling**

Three sidewall samples (DRMO-S-10, DRMO-S-14, and DRMO-S-19) from Excavations 3 and 4 exceeded the remediation levels for copper and PCBs (Table 2 and Figure 4). In compliance with the SOW, the south and west sidewalls of Excavation 4 and west sidewall of Excavation 3 were over-excavated on September 1, 1999. An 8-feet wide by 15-feet long and 2-feet deep area was excavated from each failed sidewall. Discrete floor and sidewall confirmation and QA/QC samples were collected from the new excavations at the same intervals used for the initial excavation samples. The approximately 37 CY of soil excavated from this activity was placed into three lined roll-off containers and sampled for disposal characterization. Section 2.7 summarizes the waste characterization results and identifies the disposal facility destination.

### **2.2.3 Second Step-Out Excavation and Confirmation Sampling**

Four sidewall samples (DRMO-S-26, DRMO-S-29, DRMO-S-30, and DRMO-S-35) from the first step-outs at Excavations 3 and 4 exceeded the remediation levels for copper, lead, and PCB 1260 (Table 3 and Figure 4). In compliance with the SOW, the south and west sidewalls of Excavation 4 and west sidewall of Excavation 3 were over-excavated for a second time on September 22, 1999. Discrete floor and sidewall confirmation and QA/QC samples were collected from the new excavations at the same intervals used for the initial excavation samples. The approximately 37 CY of soil excavated from this activity was placed into three lined roll-off containers and sampled for disposal characterization. Section 2.7 summarizes the waste characterization results and identifies the disposal facility destination.

### **2.2.4 Third Step-Out Excavation and Confirmation Sampling**

On October 4, 1999, a third step-out excavation at the Burn and Debris Area was conducted. Two confirmation samples from the second step-out excavation failed to meet clean-up criteria. The bottom sample (DRMO-B-58) from the second step-out at Excavation 3 and the south sidewall sample (DRMO-S-59) from the second step-out at Excavation 4 exceeded the remediation levels for copper, lead, and PCB 1260 (Table 4 and Figure 4). Discrete floor and sidewall confirmation samples were collected from the new sidewall step-out at the same intervals used for the initial excavation samples. In compliance with the SOW, the bottom sample was excavated an additional 6-inches deeper and one bottom sample was collected. The approximately 16 CY of soil excavated from this activity was placed into three lined roll-off containers and sampled for disposal characterization. Section 2.7 summarizes the waste characterization results and identifies the disposal facility destination.

Analytical results from this third confirmation-sampling event were within the remediation levels (Table 5 and Figure 4) for the compounds of concern and no additional sampling or excavation were performed.

## **2.3 REGISTERED CIVIL ENGINEERING SURVEY OF EXCAVATION**

Prior to the start of work activities, the open trench area and the burn and debris areas were surveyed by NST Engineering, Inc (NST). Lath and rebar were placed at points indicating a 5-foot east and west off-set of the excavation limits and the trench shoulder. After completion of excavation activities, the burn and debris excavations were surveyed to determine the limits of the excavation areas. Both the open trench and the burn and debris areas were surveyed after

completion of backfill and compaction activities. As a result of these surveys, the trench volume, set at finish grade, was determined to be 2,350 CY. Total volume of the Burn and Debris excavation area was 175 CY. Appendix E presents copies of the surveyed areas.

## **2.6 BACKFILL ACTIVITIES**

Importation of backfill material began on October 25, 1999, and continued through October 27, 1999. Approximately 5,038 tons of USACE pre-approved fill was imported, placed, and compacted by Baldwin Construction using fill material from their Honey Lake quarry. Appendix F presents backfill specifications and Appendix G presents daily activity reports and truckload weight tickets. Fill was placed using a motor grader to blade the material from the shoulder of the open trench into the bottom. In compliance with the project's SOW (Appendix A), no compaction testing of the fill material was required. The level of effort identified for compaction was for three passes of a 10-ton roller on a loose lift of eight inches thickness. A Caterpillar 815 Sheepsfoot compactor (approximate weight of 19 to 20 tons) was used for the compaction of the eight-inch lifts. Water was added using a water truck, and the compactor made at least the minimum 3 passes per lift, frequently more.

A pre-final inspection of the site, after completion of backfill and compaction activities, was conducted with USACE on-site personnel and ITSI personnel on October 27, 1999. Items identified at that time included the removal of two remaining roll-off containers of waste, and final survey of the site topography. Removal of the roll-off containers was completed on November 1, 1999, and final survey was completed on November 5, 1999.

## **2.7 OFF-SITE DISPOSAL OF WASTES**

A total of 21 roll-off bins containing investigation-derived wastes were disposed off-site. Two profiled waste streams were generated during this project: (1) Non-Hazardous soil and debris; and (2) non-RCRA California-Hazardous soil and debris. Wastes generated by field activities were disposed under one of these two waste streams with the exception of sample waste, which was disposed of by the contract laboratory, NEL. Personal Protective Equipment (PPE) and other consumables such as polyethylene sheeting were placed with the waste generated during their use for disposal.

Waste classification was determined through analytical testing of soils containerized in roll-off bins. The 10 bins of soil generated during the initial Burn and Debris excavation and the three bins

of surface debris were suitable for disposal as non-hazardous and profiled to the Allied Waste facility operated by Forward, Inc., near Manteca, California (a Class II facility) for landfill disposal (Appendix H). Two four-point composite samples were collected from nine bins and analyzed for total metals, total PCBs, volatile and semi-volatile organic compounds, total petroleum hydrocarbons as gas, oil and diesel, and soluble threshold limit concentration (STLC) for lead. Originally nine bins of soil were generated, but due to weight limitations for the bins, a tenth bin was used to redistribute the soil from the nine bins. The redistribution of soil occurred after the soil had been characterized for disposal.

The eight bins of soil generated from the three step-out excavations were classified as non-RCRA California-Hazardous regulated solid and profiled for disposal at Safety-Kleen's Buttonwillow Class I facility (Appendix I). Four-point composite samples were collected from each of the eight bins and analyzed for the same suite of analyses as above. The soil contained STLC lead levels above the State of California Title 22 limit of 5.0 parts per million (ppm) and thus constituents a California Hazardous Waste. To further characterize the soil, RCRA characteristics for lead by the Toxicity Characteristic Leaching Procedure (TCLP) was done with resulting levels less than the RCRA limit of 5.0 ppm. The drill cuttings from the open trench soil boring abandonment were profiled and consolidated with this waste stream for disposal.

### 3.0 DATA VALIDATION

Laboratory quality assurance/quality control (QA/QC) information was compared to the established acceptance criteria for PCB Aroclor 1260, antimony, copper, and lead. Samples were submitted for analyses to NEL, a USACE-validated and California-certified laboratory located in Reno, Nevada. Copies of laboratory validation and certification are presented in Appendix J. Synectics Environmental Chemistry Consultants (Synectics) conducted third-party validation of the data. The review criteria was based on quality control requirements contained in the analytical methods and the QAPP for the DRMO project (Enclosure 2 of Task Order 007 [USACE, 1999]). Based on the data evaluated by Synectics, the overall quality of the data appears to be good. A minimal portion of the data set was qualified due to matrix effects. The overall completeness objectives for this project were met as specified in Section 2.5.1 of Chemical Data Quality Management Plan (CDQMP) (ITSI, 1998a). Duplicate relative percent differences (RPD) were within the 50% range (as specified in Table 5 of ITSI's CDQMP [ITSI, 1998a]) for all but one duplicate (DRMO-B-112) which was attributed to sample homogeneity. Appendix K presents Synectics' data validation report, the Project Completeness Summary and Field Duplicate Summary.

## 4.0 CONCLUSIONS

The objectives of the remediation activities were met through the removal of soil above the remediation cleanup criteria for PCB Aroclor 1260, lead, copper, and antimony at the Burn and Debris Area, the removal of surface debris from both the Burn and Debris and Open Trench areas, and the backfill and grading of both areas. Confirmation samples collected from the excavation sidewalls and floors verified the final extent of the Burn and Debris excavation and the excavation was closed in compliance with the Workplan.

The final volume of impacted Burn and Debris soil (225 CY) exceeded the originally anticipated volume (85 CY) of impacted soil. Eighty-five CY of soil required disposal as non-hazardous waste at a Class II landfill and the remaining 140 CY required disposal as non-RCRA California hazardous waste at a Class I landfill. The project also generated 235 CY of non-hazardous debris (scrap metal, vegetation, and trash). The excavation and open trench areas were backfilled and graded to minimize ponding. Two stakes were posted at either end of the former trench after grading was completed to aid in identifying the centerline of the trench for upcoming site work beyond the scope of this project. Final site restoration was approved by SIAD and USACE site personnel on November 3, 1999.